

6.2 | Automatic Blade Control

Automatic Blade Control is the process **Level COMMAND** uses to guide the implement towards the required target position while grading.

Once **Automatic Control** is engaged, **Level COMMAND** continually monitors the implement position, compares it with the required target position and sends control commands to the **COMMAND** ECU. The **COMMAND** ECU then operates the configured hydraulic outputs to move the implement as required.

This process repeats continuously while **Automatic Control** remains engaged.

Control Overview

During normal operation, **Level COMMAND** continually performs the following control process:

1. Determine the current implement position.
2. Determine the required target position.
3. Compare the current position with the target position.
4. Calculate the current control error.
5. Send the required control command to the **COMMAND** ECU.
6. Measure the new implement position.
7. Repeat the process as the machine moves.

This continuous feedback allows **Level COMMAND** to respond to changing terrain and maintain accurate control throughout the grading operation.

Closed-Loop Control

Automatic Blade Control is a closed-loop control system.

Rather than commanding the implement to move once and assuming the correct position has been reached, **Level COMMAND** continually measures the implement position and updates hydraulic commands until the implement is tracking the target position correctly.

This continuous feedback allows the system to compensate for changing ground conditions and maintain accurate grading performance.

What Determines the Target Position?

The target position is derived from the loaded design together with any active operator settings.

Depending on the current grading task, the target position may be influenced by:

- Design surface
- Blade Shift
- Dynamic Cut Limiting
- Dynamic Fill Limiting

Because of this, the target position may not always be identical to the final design surface at that moment. However, the objective remains the same: to guide the implement smoothly towards the intended finished surface.

Hydraulic Response

Hydraulic systems require a small amount of time to respond to control commands. As a result, the implement does not move instantly when the target position changes.

Instead, **Level COMMAND** continuously monitors implement position and adjusts hydraulic output as the machine moves. This produces smooth, stable grading while allowing the implement to progressively converge on the target position.

Later in this chapter, **Look Ahead** is introduced as one method used to further improve tracking performance by anticipating changes in terrain.

When the Implement Is Far from Target

The amount of hydraulic correction applied depends on how far the implement is from the target position.

When close to the target, **COMMAND** makes small corrections to accurately maintain grade.

When further from the target, larger corrections may be applied to return the implement more quickly.

If the implement moves beyond the configured operating range, automatic movement may be suspended until the operator manually returns the implement closer to the working surface.

Operator Responsibility

Automatic Control assists with implement positioning, but the operator remains responsible for machine operation.

The operator must still:

- Choose the travel path.
- Manage material movement.
- Maintain safe travel speed.
- Monitor cut/fill behaviour.
- Watch for obstacles, people and changing ground conditions.
- Disengage **Automatic Control** if machine behaviour is unexpected.

Level COMMAND can guide the implement towards the target position, but it does not determine the overall earthmoving strategy. Efficient grading still depends on good operator judgement and planning.

Continue to **6.3 | Blade Control Modes** to learn how **Level COMMAND** determines the target position beneath the blade for different grading situations.
